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MODEL **3569**

Portable AC mΩ Meter

Instruction Manual

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I-02012

TSURUGA ELECTRIC CORPORATION

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## 1. Preface

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We thank you for your purchase of our MODEL 3569. For safety and proper use of this product, please carefully read this instruction manual before the initial operation.

### CAUTION

- To avoid break-down, malfunction or deterioration of life time, do not use this product in such places where:
  - ◆ exposed to rain, water drops or direct sunlight.
  - ◆ high temperature or humidity, heavy dust or corrosive gas.
  - ◆ affected by external noise, radio waves or static electricity.
- Where there is constant vibration or shock.
- Do not dismantle or modify this product.

## 1.1●Preparations prior to use

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### 1.1.1 Inspection

When the meter is delivered, please check whether it conforms to the ordered specifications and has not been damaged in transit. If any damage or inconvenience in operation is found, please inform us of the model name and serial number of the product.

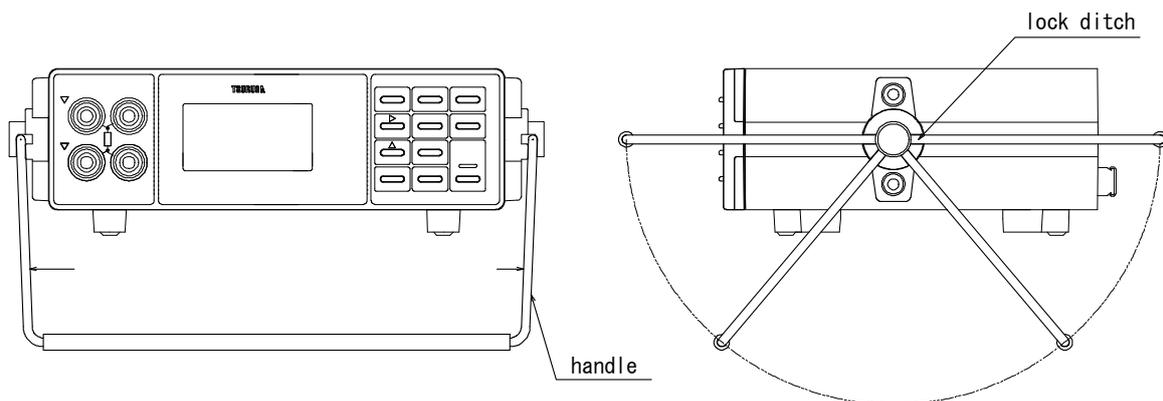
### 1.1.2 Storage

When the meter is not in use for long time, store it in the place of low humidity where the meter is not exposed to the direct sunlight.

When the meter is stored for a long term, remove the batteries

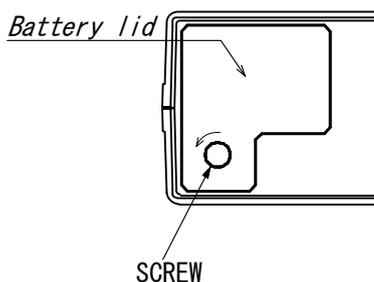
### 1.1.3 Handle

Set up the handle, by slightly expanding it as the arrows show and inserting it into the locking ditch.



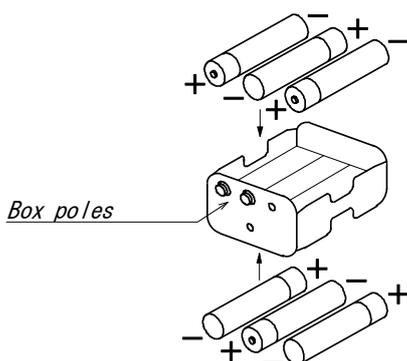
### 1.1.4 Loading of batteries

#### ① Attachment/detachment of rear battery lid

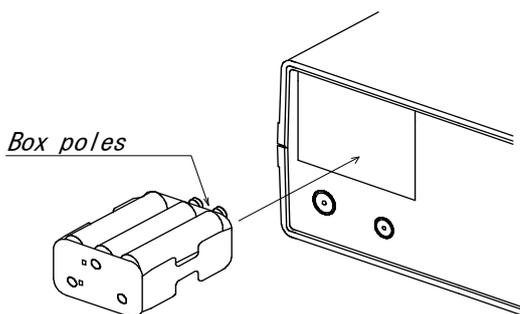


Attach or detach the lid by screwing

#### ② Loading of batteries



Put a six LR6 or R6P batteries in the battery compartment, paying attention to their direction.

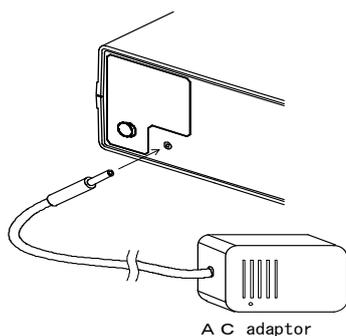


Insert the battery box, bringing its poles far side, and close the lid.

### 1.1.5 Battery alarm

- ..... Full charged
- ..... A little discharged
- ..... Less charged
- / (Blink) .. Batteries need to be replaced

### 1.1.6 Connection of AC adaptor

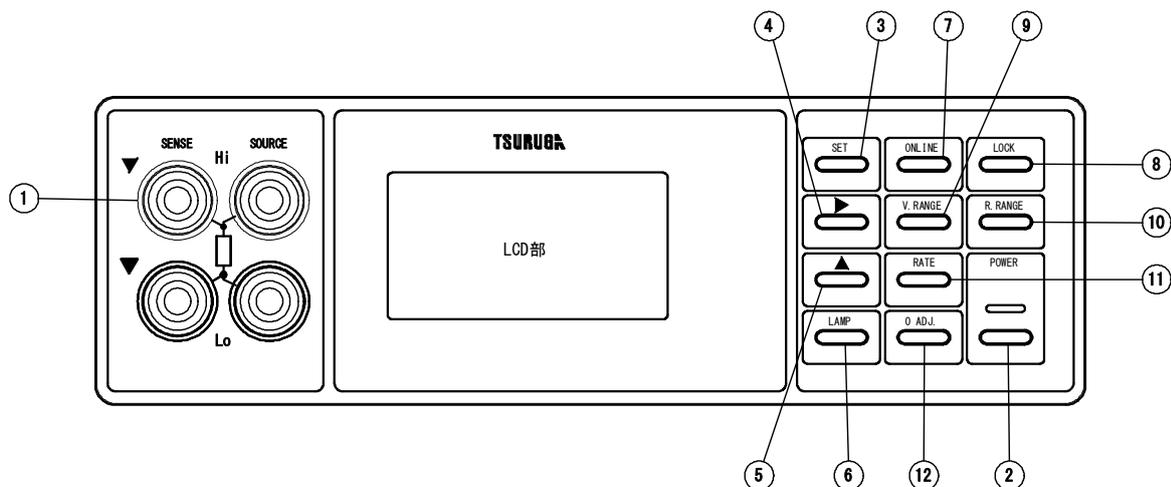


Take a power supply from the commercial power source with the AC adaptor.

Supply voltage of AC adaptor: 100~240V AC 50/60Hz.

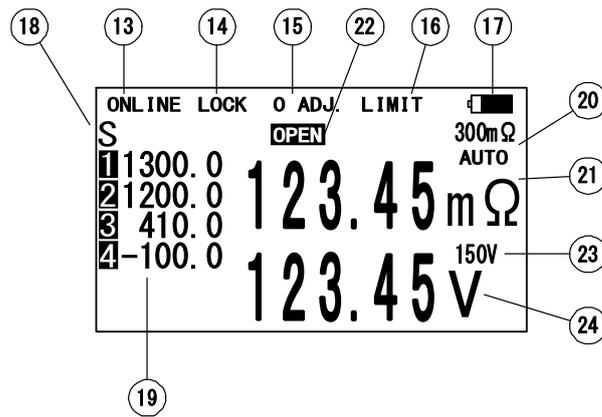
## 2. Name of parts and functions

### 2.1 ● Front panel



- |                       |  |
|-----------------------|--|
| ① Measuring terminals | SENSE Hi : +side terminal of voltage input.<br>SENSE Lo : -side terminal of voltage input.<br>SOURCE Hi : +side terminal of current output.<br>SOURCE Lo : -side terminal of current output. |
| ② <b>POWER</b> key    | Key for power supply. The green lamp is lit up when the tester is turned ON.   |
| ③ <b>SET</b> key      | Key to changeover the when supplying the power.  |
| ④ <b>▶</b> key        | Used for selection when setting.   |
| ⑤ <b>▲</b> key        | Used for change when setting.  |
| ⑥ <b>LAMP</b> key     | Key to turn ON/OFF the LCD back light.   |
| ⑦ <b>ONLINE</b> key   | On-line key for RS-232C.   |
| ⑧ <b>LOCK</b> key     | Key to lock the front panel. Unlock by pressing this for more then 3 seconds.  |
| ⑨ <b>V.RANGE</b> key  | Key to select the voltage range from 15V/150V or AUTO.   |
| ⑩ <b>R.RANGE</b> key  | Key to select the resistance from 30mΩ to 3Ω or AUTO.  |
| ⑪ <b>RATE</b> key     | Key to select a sampling rate.   |
| ⑫ <b>0 ADJ.</b> key   | ON/OFF key for zero adjustment function.   |

## LCD WINDOW

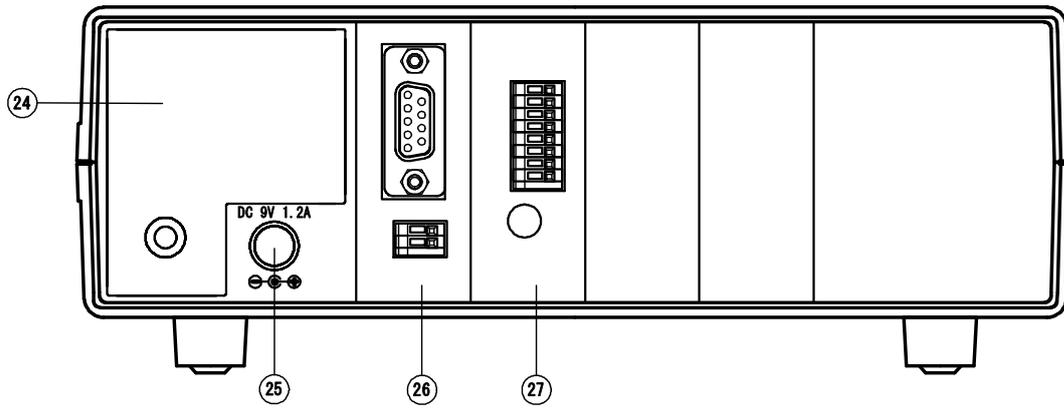


- |                    |  |
|--------------------|--|
| ⑬ ONLINE           | It displays it in the remote controlled.                     |
| ⑭ LOCK             | It displays it in the key lock.                              |
| ⑮ 0 ADJ            | It displays it in zero adjustment operation.                 |
| ⑯ LIMIT            | It displays it in voltage limitation function is in working. |
| ⑰                  | Display for the battery condition.                           |
| ⑱ F                | Flashes when the sampling rate is 10 times/sec.              |
| S                  | Flashes when the sampling rate is 2 times/sec.               |
| Ⓢ Temperature      | Display temperature.   |
| Ⓣ Resistance range | Displays the range 300mΩ~3 Ω being measured.                 |
| Ⓤ Resistance       | Display the resistance unit and value.                       |
|                    | Display 'OVER' when the range is over.                       |
| Ⓦ Break detection  | Display <b>OPEN</b> when breaking the wire.                  |
| Ⓥ Voltage range    | Displays the range 15V~150V being measured.                  |
| Ⓦ Voltage          | Display the voltage unit and value.                          |
|                    | Display 'OVER' when the range is over.                       |

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## 2.2●Rear panel

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④ Battery box

⑤ AC adaptor connector

⑥ RS232C analog output unit  
Connect the RS232C to the upper D-sub connector.  
Connect the analog output to the lower terminals.

⑦ Temperature input unit  
Use for temperature input. Available K, J or T type thermocouple sensors.

### 3. Operation

#### 3.1 Power supply

Turn ON the power switch on the front panel. A pilot lamp is lit up and the meter immediately enters the operable condition.

The meter is provided with the function to retain the parameters, so it memories the status of the followings even after the meter is switched OFF.

- (1) Measuring range of resistance.
- (2) Measuring range of voltage.
- (3) Sampling rate.
- (4) Key-lock condition.
- (5) Zero-adjust condition.
- (6) Voltage limitation setting.
- (7) Temperature input setting.
- (8) Communication setting.

#### 3.2 Connection of measuring terminals

Connect the Kelvin clip to the measuring terminals on the front panel.

Please carry out plugging of the Kelvin clips (banana plug side) and the resistance meter as follows.

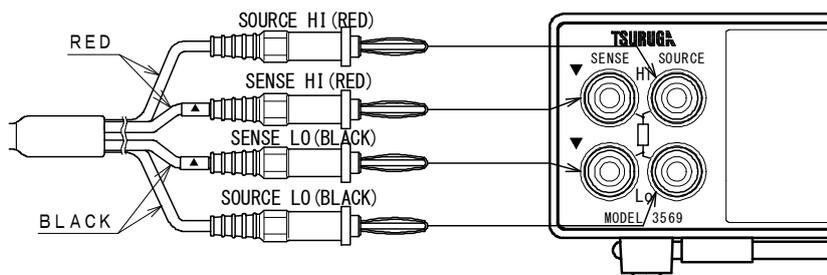
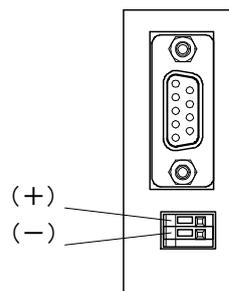


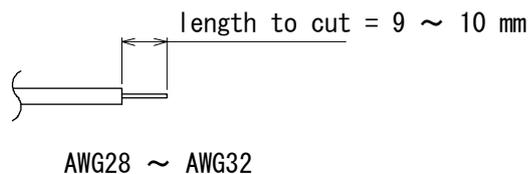
Fig.3.2.1 Connection of optional Kelvin clip (MODEL 5811-21B).

#### 3.3 Connection of analog output

Output the analog datum, which is in proportional to the measuring value.



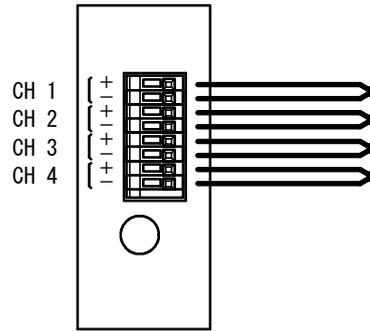
Push down the release knob with a screwdriver or else and insert the cable to the terminals.



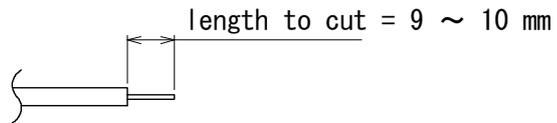
Data output: 0 to 3V DC.  
Display 0:0.000V  
30000:3.000V

### 3.4●Connection of temperature sensor (optional use)

Temperature measurement is possible by connecting the thermocouple sensor to the terminal.



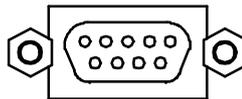
Push down the release knob with a screwdriver or else and insert the cable to the terminals.



### 3.5●Connection of RS-232C

#### 3.5.1 Connector and signal

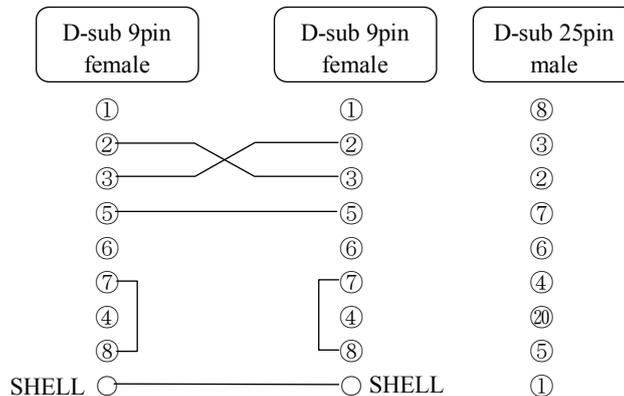
Connector : D-sub 9pin.



Pin No.	Signal JIS (RS-232C)	Direction	Name
①			N/C
②	RD (RXD)	Input	Receiving data
③	SD (TXD)	Output	Transmission data
④			N/C
⑤	SG (GND)		Ground for signal
⑥			N/C
⑦			N/C
⑧			N/C
⑨			N/C

#### 3.5.2 Connection cable

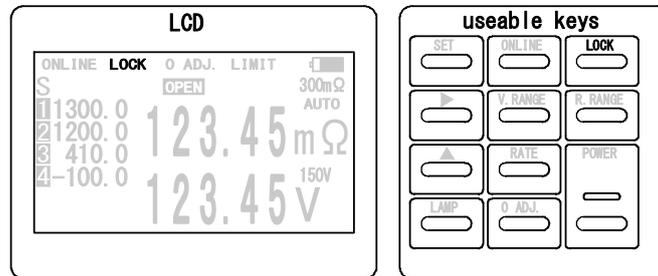
Hardware: without handshake



### 3.6●Key lock

This is the switch to prohibit the key operation on the front panel so that the measuring condition can not be carelessly altered.

LOCK lamp is lit up during the key locking. When required to operate other switch, do it after releasing the key lock.



To make key lock

The key is locked when the **LOCK** key is pressed for more than 3 seconds.

While the key is locked, LOCK mark is displayed at the upper side of the LCD.

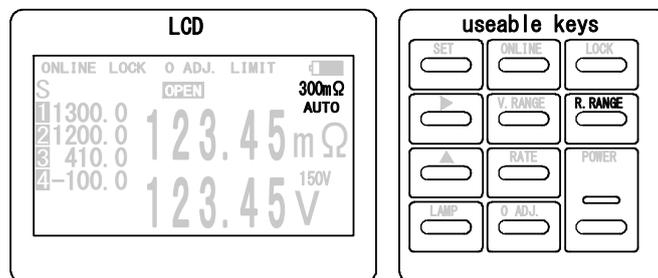
To release key lock

When the **LOCK** key is pressed again for more than 3 seconds, the key lock is cancelled.

### 3.7●Change-over of resistance range

Select a measuring range (auto range or manual range) of resistance measurement.

This operation is disabled in memory mode and when the status is ONLINE or HOLD.



(1) Auto range

- The measuring range automatically steps up when the display value is 35000 or higher and steps down when the display value is less than 3000.
- AUTO mark and the resistance range automatically detected are displayed at the right of the LCD.

Selection of AUTO range

When the **R.RANGE** key is pressed at the 3 Ω range, AUTO lamp is lit up and the meter enters the auto ranging.

(2) Manual range

- The range is fixed at 30mΩ~3 Ω.
- The lamp of the selected range is lit up.

Change-over of range

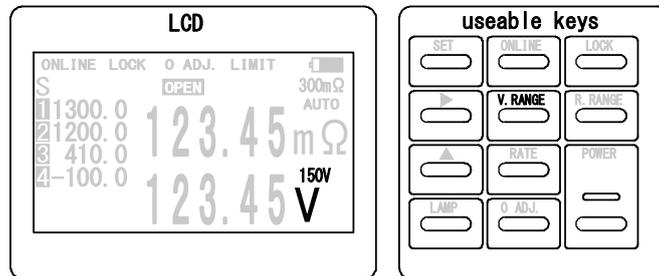
Every time the **R.RANGE** key is pressed, the range mark (30mΩ~3 Ω) at the right of the LCD changes. Select the desired range.

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### 3.8●Change-over of voltage range

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Select a measuring range (auto range or manual range) of voltage measurement.  
This operation is disabled in memory mode and when the status is ONLINE or LOCK.



#### (1) Auto range

- The measuring range automatically steps up when the display value is 15000 or higher and steps down when the display value is less than 1400.
- AUTO mark is displayed at the right of the LCD.

#### Selection of AUTO range

When the **V.RANGE** key is pressed at the 150V range, AUTO lamp is lit up and the meter enters the auto ranging.

#### (2) Manual range

- The range is fixed at 15V,150V.
- The lamp of the selected range is lit up.

#### Change-over of range

Every time the **V.RANGE** key is pressed, the range mark at the right of the LCD changes. Select the desired range.

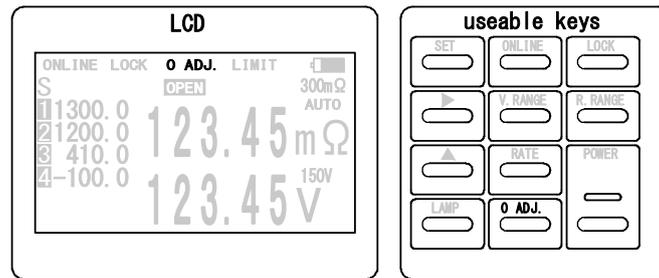
### 3.9●Zero adjustment

This is the function to suppress the resistance of tools and so on in resistance measurement. The value currently measured is memorized as zero set value into the non-volatile memory and afterwards, the value from which the zero set value is suppressed is displayed.

$$\boxed{\text{Display value}} = \boxed{\text{Measured value}} - \boxed{\text{Zero set value}}$$

- Zero set value is effective in all ranges.
- In case that the zero adjustment is made in the higher range, it may over-range in the lower range.
- External control by RS-232C is possible.
- The operation is not allowed in the ON LINE or LOCK status.

#### 3.9.1 Key operation

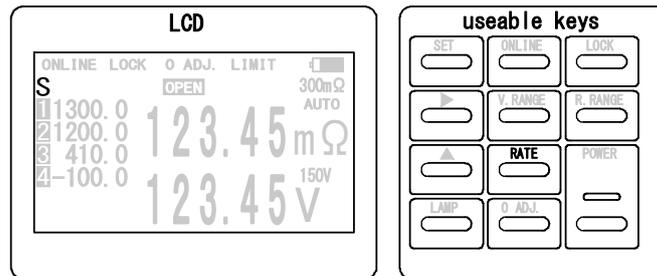


A press of the **0 ADJ.** key activates the operable condition of zero adjustment. During the zero adjustment, 0 ADJ. mark is displayed at the upper side of the LCD. Pressing again of the **0 ADJ.** key cancels the zero adjustment.

### 3.10●Selection of sampling rate

Make a choice of sampling rate with key operation on the front panel.

- Remote control through the interface RS-232C is possible.
- Selection is not possible in the ON LINE or LOCK status.



The sampling rate changes by pressing the **RATE** key  
 S→F→S      S lighting    : 2 times/sec.  
                   F lighting    : 10 times/sec.

## 4. Setting

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### 4.1 Contents of setting

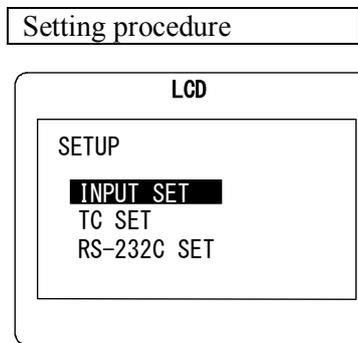
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Following setting is possible at the setting mode by pressing the **SET** key.

- The operation is not allowed in the ON LINE or LOCK status.
  - When no key operation is made for 5 minutes during the setting, the meter returns to the measuring mode.
- Resistance, Voltage measurement  
Voltage limit function
  - Temperature input  
Temperature sensor setting  
Temperature scanner setting
  - Communication  
RS-232C setting

### 4.2 Setting menu

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(1) Enter the setting menu by pressing the **SET** key.

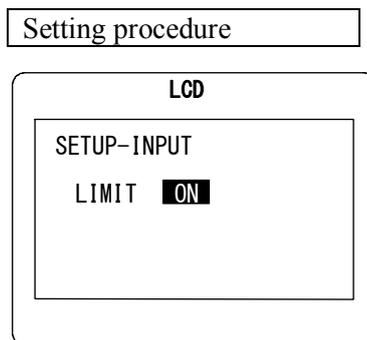
(2) Select the item by pressing the **▶** key.

(3) Enter the selected item by pressing the **▲** key.

**NOTE:** Return to the measuring mode to by pressing the **SET** key.

### 4.3 Voltage limit setting

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(1) Enter the voltage limit setting by selecting the **INPUT SET** in the setting mode.

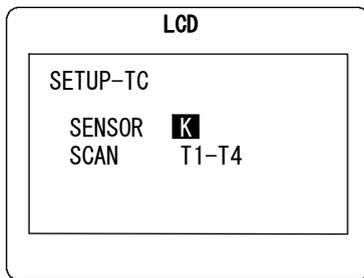
(2) Select ON/OFF by pressing the **▲** key.

(3) Save the setting by pressing the **SET** key.

LIMIT	Voltage limit setting
ON	Effective
OFF	Disabled

## 4.4●Temperature input

### Setting procedure



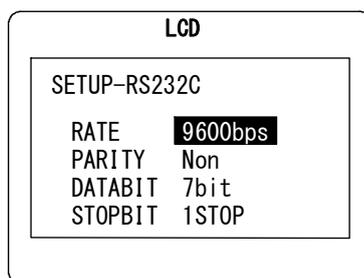
- (1) Enter the temperature input setting by selecting the **TC SET** in the setting mode.
- (2) Select the item by pressing the key.
- (3) Enter the selected item by pressing the key.
- (4) Save the setting by pressing the **SET** key.

SENSOR	Select the type of thermocouple
K	K type
J	J type
T	T type

SCAN	Select the temperature scanner
T1	Display CH1 only
T1 – T2	Display from CH1 to CH2
T1 – T3	Display from CH1 to CH3
T1 – T4	Display from CH1 to CH4

## 4.5●Communication

### Setting procedure



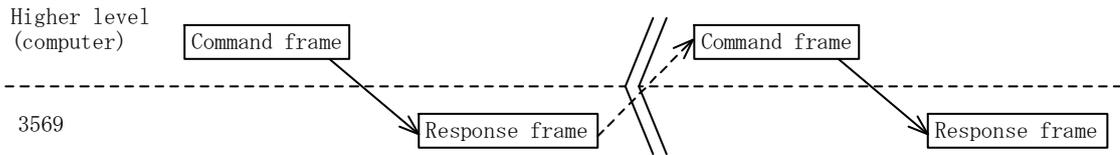
- (1) Enter the communication setting by selecting the **RS232C SET** in the setting mode.
- (2) Select the item by pressing the key.
- (3) Enter the selected item by pressing the key.
- (4) Save the setting by pressing the **SET** key.

**NOTE:** STOPBIT setting is impossible. It is fixed to 1STOP.

RATE	Select Transmission speed from 2400, 4800, or 9600 bps
PARITY	Select Parity from Non, EVEN or ODD
DATABITS	Select Data length from 7 or 8 bit
STOPBIT	Fix the stop bit to 1bit (1 STOP)

## 5. RS-232C Communication

### 5.1 ● Operation



Response frame:

When receiving valid setting command, send back the data.

When receiving valid output command, output specified data.

When receiving invalid command, send back "Command Error".

Example: Valid command : FUNCTION=OHM  $\boxed{C_R}$   $\boxed{L_F}$   
 Response : FUNCTION=OHM  $\boxed{C_R}$   $\boxed{L_F}$   
 Invalid command : FUNCTION=MACHIGAI  $\boxed{C_R}$   $\boxed{L_F}$   
 Response : Command Error  $\boxed{C_R}$   $\boxed{L_F}$

### 5.2 ● Programming

#### 5.2.1 Program data

JIS punctuation code is used for the command data.

Example:

RANGE=30kOHM  $\boxed{C_R}$   $\boxed{L_F}$

Command Delimiter

1. Command Command to control the 3569.
2. Delimiter Code (delimiter) to inform the 3569 of the finish of transmission data block.  
 $\boxed{L_F}$  judged as delimiter when received the (OAH).

#### 5.2.2 REMOTE (set to remote)

$\boxed{\text{Function}}$  The setting and control through RS-232C is possible at the remote status.

$\boxed{\text{Structure}}$  REMOTE

$\boxed{\text{Transmission}}$

REMOTE

#### 5.2.3 LOCAL (reset the remote)

$\boxed{\text{Function}}$  Reset the remote status.

$\boxed{\text{Structure}}$  LOCAL

$\boxed{\text{Transmission}}$

LOCAL

## 5.2.4 DATA? (read-out of measuring data)

**Function** Read-out of measuring data.

**Structure** DATA?

**Transmission**

DATA?  $\text{C}_R$   $\text{L}_F$

**Response**

OHM=299.99mOHM, VOLT=4.3210V  $\text{C}_R$   $\text{L}_F$

When the temperature input is effective

OHM=299.99mOHM, VOLT=4.3210V, T1= 45.3' C, T2= 55.2' C, T3= 62.8' C, T4= 77.1' C  $\text{C}_R$   $\text{L}_F$

## 5.2.5 RANGE= (setting of resistance range)

**Function** Setting of resistance range.

**Structure** RANGE= **RANGE**

RANGE=: Resistance measuring setting command.

**RANGE**: Set the range among 30m $\Omega$  to 3 $\Omega$ .

Set AUTO for the auto-range.

Range code	Measuring range
30mOHM	30 m $\Omega$
300mOHM	300 m $\Omega$
3OHM	3 $\Omega$
AUTO	Auto-range

**Transmission**

Set the resistance measuring range to 30m $\Omega$ .

RANGE=30mOHM  $\text{C}_R$   $\text{L}_F$

## 5.2.6 RANGE? (read-out of resistance range)

**Function** Read-out the setting condition of resistance range.

**Structure** RANGE?

**Transmission**

RANGE?  $\text{C}_R$   $\text{L}_F$

**Response**

RANGE=30mOHM  $\text{C}_R$   $\text{L}_F$

① ②

① Show the range data output.

② Show the data of setting condition of the range.

---

### 5.2.7 VOLT= (setting of voltage range)

**Function**      Setting of voltage measuring range.

**Structure**      VOLT= **RANGE**  
VOLT=: Voltage measuring setting command.  
**RANGE**: Set the range among 15V/150V.

Range code	Measuring range
15V	15V
150V	150V

**Transmission**

Set the voltage measuring range to 150V.

VOLT=150V

### 5.2.8 VOLT? (read-out of voltage range)

**Function**      Read-out the setting condition of voltage measuring range.

**Structure**      VOLT?

**Transmission**

VOLT?

**Response**

VOLT=15V

①    ②

- ① Show the range data output.
- ② Show the data of setting condition of the range.

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### 5.2.9 SAMPLING= (setting of sampling rate)

Function	Setting of sampling rate.
Structure	SAMPLING= SLOW/FAST SAMPLING=: Sampling rate setting command. SLOW/FAST : SLOW 2times/sec, FAST 10times/sec.
Transmission	
	Set the sampling rate to SLOW. SAMPLING=SLOW

### 5.2.10 SAMPLING? (read-out of sampling rate)

Function	Read-out the setting condition of sampling rate.
Structure	SAMPLING?
Transmission	
	SAMPLING?
Response	
	SAMPLING=SLOW ①      ②

- ① Show the data output.
- ② Show the data of setting condition.

---

### 5.2.11 ZEROADJ= (setting of zero adjustment)

**Function**            Setting of zero adjustment.  
Zero adjustment action is that the measured value at the moment when the ZEROADJ=ON is memorized as the zero set value. The value deducted the zero set value from the measured value is displayed and output until ZEROADJ=OFF is received.

**Structure**            ZEROADJ= **ON/OFF**  
ZEROADJ= : Zero adjustment setting command.  
**ON/OFF** : ON is effective, OFF is disabled.

**Transmission**

Set the zero adjustment to ON.  
ZEROADJ=ON

### 5.2.12 ZEROADJ? (read-out of zero adjustment)

**Function**            Read-out the setting condition of zero adjustment.

**Structure**            ZEROADJ?

**Transmission**

ZEROADJ?

**Response**

ZEROADJ=OFF  
①        ②

- ① Show the data output.
- ② Show the data of setting condition.

---

### 5.2.13 HOLD= (setting of hold)

Function	Set the start and cancellation of the hold.
Structure	HOLD= ON/OFF HOLD= : Hold setting command. ON/OFF : Stop the sampling and hold the data with "ON". Designate the cancellation of hold with "OFF".

Transmission

Set the hold to ON.

HOLD=ON

### 5.2.14 HOLD? (read-out of hold)

Function	Read-out the setting condition of hold.
Structure	HOLD?
Transmission	

HOLD?

Response

HOLD=ON  
① ②

- ① Shows the data output.
- ② Shows the data of setting condition.

### 5.2.15 TRG (trigger command)

Function	Sampling designation under hold condition
Structure	TRG TRG : If receive the command under the hold condition, one sampling hold would be done.
Transmission	

TRG

---

### 5.2.16 SENSOR= (setting of temperature sensor)

**Function**            setting of temperature sensor.

**Structure**            SENSOR= **SENSOR**  
SENSOR=            : Temperature sensor setting command.  
**SENSOR**            : Set the temperature sensor .

Code	Type of Thermocouple
K	K
J	J
T	T

**Transmission**

SENSOR=K

### 5.2.17 SENSOR? (read-out of temperature sensor)

**Function**            Read-out the setting condition of temperature sensor.

**Structure**            SENSOR?

**Transmission**

SENSOR?

**Response**

SENSOR=K  
①    ②

- ① Shows the data output.
- ② Shows the data of setting condition.

---

### 5.2.18 SCAN= (setting of scanner)

**Function**      setting of scanner.

**Structure**      SCAN= **Channel**

SCAN=      : Setting command of temperature sensor scanner.

**Channel**      : 1/2/3/4

**Transmission**

Set to 4 (from CH1 to CH4)

SCAN=4

### 5.2.19 SCAN? (read-out of scanner)

**Function**      Read-out the setting condition of temperature sensor scanner.

**Structure**      SCAN?

**Transmission**

SCAN?

**Response**

SCAN=4

① ②

① Shows the data output.

② Shows the data of setting condition.

---

### 5.2.20 LIMIT= (setting of voltage limit)

**Function**            setting of voltage limit.

**Structure**            LIMIT= **ON/OFF**  
LIMIT=            : Setting command of Voltage limit.  
ON/OFF            : ON is effective, OFF is disabled.

**Transmission**

LIMIT=ON

### 5.2.21 LIMIT? (read-out of voltage limit)

**Function**            Read-out the setting condition of voltage limit.

**Structure**            LIMIT?

**Transmission**

LIMIT?

**Response**

LIMIT=ON  
①    ②

- ① Shows the data output.
- ② Shows the data of setting condition.

## 6. Extension of lead wires.

---

### ●Cautions of the extension of lead wires

- ① Make the extension by 4 terminals system (2 wires for SENSE, 2 wires for SOURCE).  
If the wiring is made by 2 wires, the wiring or contact resistance is included in the measured value, having caused an incorrect measurement value.
- ② Make the wiring so that the forked section of the lead is as short as possible.
- ③ Keep the measuring distant from the metallic part. If it is close to the metallic part, it may cause an inaccurate measurement due to the eddy current.
- ④ When the lead wire is extended, take care that the lead wire resistance does not exceed the tolerable range specified in the following table.

Tolerable range of lead wire resistance of SENSE lead

Resistance range	Voltage limit	
	ON	OFF
30mΩ	800mΩ	1.6Ω
300mΩ	11Ω	11Ω
3Ω	90Ω	90Ω

## 7. Calibration

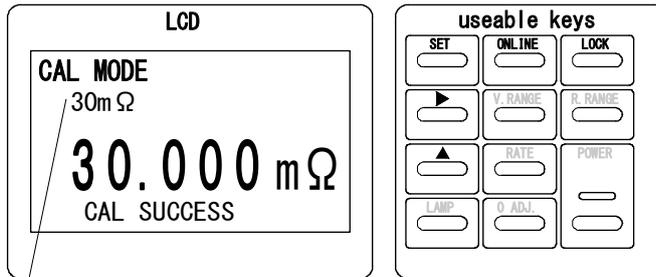
### 7.1 Materials to prepare

To calibrate the 3569, prepare the following standard resistors for calibration.  
For resistance measurement ranges: 30mΩ, 300mΩ, 3Ω

**Note:** Select the calibration resistors whose accuracy secures the same of 3569.

### 7.2 Calibration method

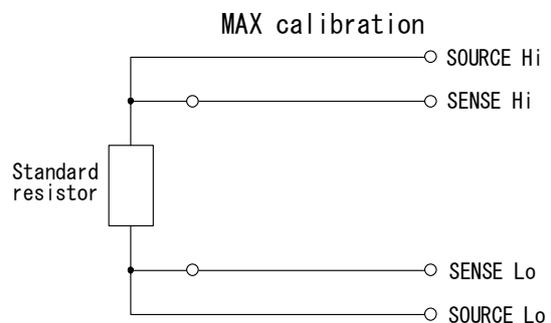
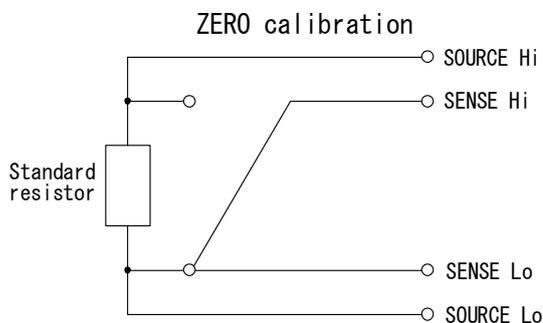
#### 7.2.1 Calibration of resistance measuring range



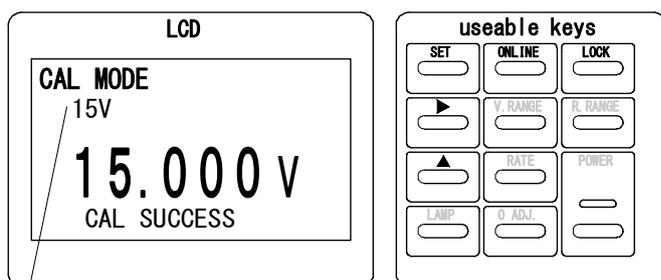
Display the calibration tange

- ① Press the **ONLINE** key and the **LOCK** key at the same time, so that the power turns on.
- ② When the entered the calibration, it is for the 30mΩ.
- ③ Calibrates ZERO by pressing the **▶** key.
- ④ Calibrates MAX by pressing the **▲** key.
- ⑤ Change the range by pressing the **SET** key. When the calibration is successful, CAL SUCCESS is displayed. If displayed CAL ERROR, it is exceeded the calibration range. Connect the proper resistor.
- ⑥ The standard resistance value and display value of each range is shown below.
- ⑦ When the calibration is finished, turn the power off by pressing the **POWER** key. When the meter is powered on again, it returns to measuring mode.

Range	Standard resistance value	ZERO display value	MAX display value
30mΩ	30mΩ	0.000mΩ	30.000mΩ
300mΩ	300mΩ	0.00mΩ	300.00mΩ
3Ω	3Ω	0.0000Ω	3.0000Ω

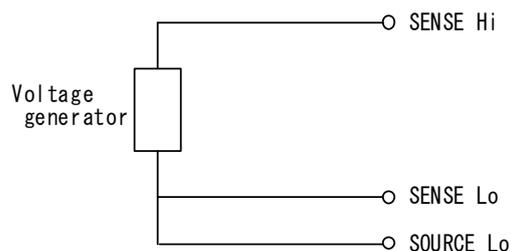


## 7.2.2 Calibration of voltage measurement

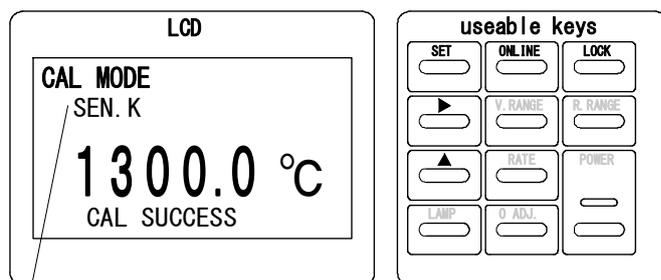


Display the calibration range

- ① Press the **ONLINE** key and the **LOCK** key at the same time, so that the power turns on.
- ② Press the **SET** key to calibrate the 15V.
- ③ Calibrates ZERO by pressing the **▶** key.
- ④ Calibrates MAX by pressing the **▲** key.
- ⑤ Change the range by pressing the **SET** key. When the calibration is successful, CAL SUCCESS is displayed. If displayed CAL ERROR, it is exceeded the calibration range. Connect the proper resistor.
- ⑥ When the calibration is finished, turn the power off by pressing the **POWER** key. When the meter is powered on again, it returns to measuring mode.



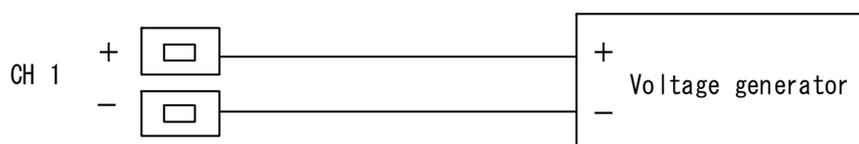
### 7.2.3 Calibration of temperature measurement (optional use)



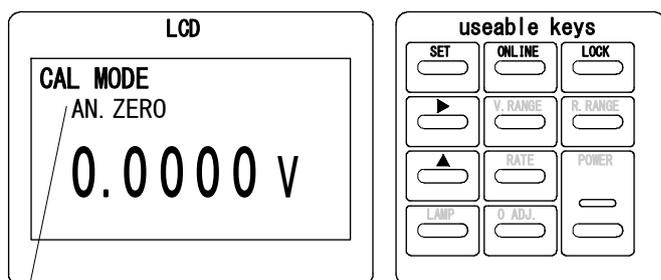
Display the calibration range

- ① Press the **ONLINE** key and the **LOCK** key at the same time, so that the power turns on.
- ② Press the **SET** key to calibrate the K sensor. (SEN.K)
- ③ Calibrates ZERO by pressing the **▶** key.
- ④ Calibrates MAX by pressing the **▲** key.
- ⑤ Change the range by pressing the **SET** key. When the calibration is successful, CAL SUCCESS is displayed. If displayed CAL ERROR, it is exceeded the calibration range. Connect the proper resistor.
- ⑥ The standard resistance value and display value of each range is shown below.
- ⑦ When the calibration is finished, turn the power off by pressing the **POWER** key. When the meter is powered on again, it returns to measuring mode.

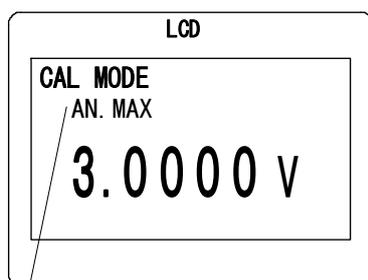
Sensor	Calibration Range	ZERO input	MAX input	
K	SEN.K	0.000mV	52.410mV	1300.0°C
J	SEN.J	0.000mV	69.553mV	1200.0°C
T	SEN.T	0.000mV	20.872mV	400.0°C



## 7.2.4 Calibration of analog output



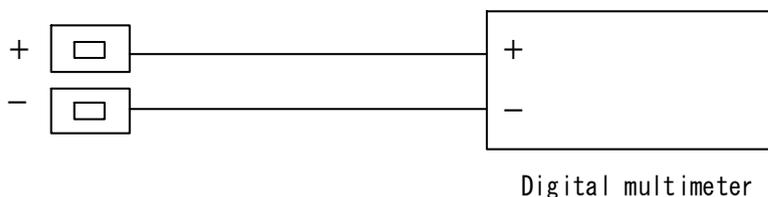
Display the calibration range



Display the calibration range

- ① Press the **ONLINE** key and the **LOCK** key at the same time, so that the power turns on.
- ② Press the **SET** key to calibrate ZERO of the analog output.
- ③ Output increases by pressing the **▶** key, and decreases pressing the **▲** key. Calibrates ZERO to 0.0000V output voltage, and MAX to 3.0000V.
- ④ Change the range by pressing the **SET** key. (to move to the next calibration item 30mΩ).
- ⑤ When the calibration is finished, turn the power off by pressing the **POWER** key. When the meter is powered on again, it returns to measuring mode.

**NOTE:** Turn the power off only after performing the step (4), i.e. after moved to the next calibration item 30mΩ



## 8. Specifications

### 8.1 Model name

Model name	Description
3569	Without temperature input
3569-01	With temperature input

### 8.2 Measuring range & accuracy

#### ■ Resistance measurement (at SLOW / FAST sampling)

Measuring range	30mΩ	300mΩ	3Ω
Resolution	1μΩ	10μΩ	100μΩ
Measuring current	7.4mA	1mA	100μA
Accuracy *	±(0.5% of rdg.+8digit)		
Temp. coefficient	±(0.05% of rdg.+0.8digit)/ °C		
Open terminal Voltage	20mV peak or less (with ON/OFF function)		

\* Accuracy: Defined at 23°C±5°C, 45 to 75%RH.

When the sampling rate is FAST, 3 digits are added to the accuracy.

#### ■ Voltage measurement (at SLOW / FAST sampling)

Measuring range	15V	150V
Resolution	1mV	10mV
Accuracy *	±(0.05% of rdg.+5digit)	
Temp. coefficient	±(0.005% of rdg.+0.5digit)/ °C	

\* Accuracy: Designated at 23°C±5°C, 45 to 75%RH.

When the sampling rate is FAST, 3 digits are added to the accuracy.

#### ■ Temperature measurement(at -01)

Temperature sensor	K	J	T
Measurement range	-100.0 to 1300.0°C	-140.0 to 1200.0°C	-200.0 to 400.0°C
Display range	-200.0 to 1350.0°C	-200.0 to 1250.0°C	-250.0 to 420.0°C
Accuracy	*	±(0.1% of rdg.+ 0.5°C)	
Temp. coefficient	±(0.02% of rdg.+0.1°C)		

\* Accuracy: ±(0.1% of rdg.+ 0.6°C) -100.0 to 0.0°C

±(0.1% of rdg.+ 0.5°C) 0.0 to 1300.0°C

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### 8.3●General specifications

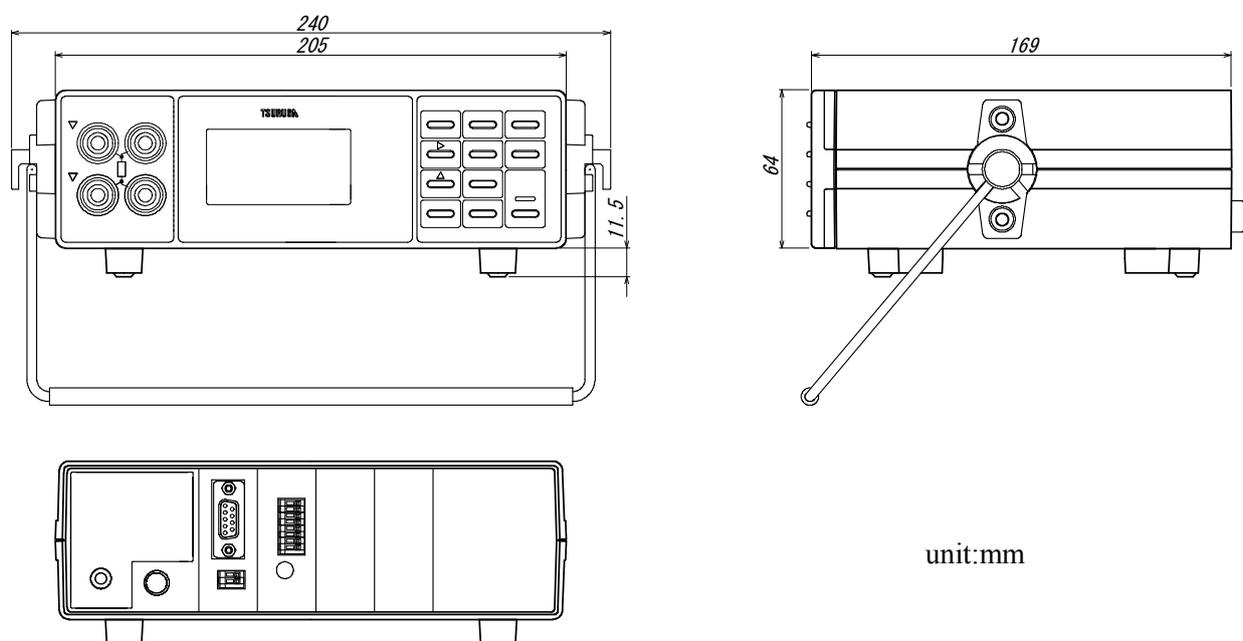
---

Measuring system	:	AC 4-terminals system
A/D Conversion	:	$\Delta$ - $\Sigma$ conversion system.
Tolerable max. apply voltage	:	200V for all ranges.
Measuring Frequency	:	1kHz $\pm$ 20Hz AC
Display	:	LCD
		Resistance measurement : 35000
		Voltage measurement : 50000 (w/polarity)
		Provided with zero suppress function.
Over-range display	:	OVER
Unit display	:	m $\Omega$ , $\Omega$ , V
Sampling rate	:	SLOW : 2 times/sec. FAST : 10 times/sec.
Response speed	:	SLOW : approx. 1.6s. FAST : approx. 667ms.
Analog output	:	Per resistance value. Output 3V full-scale, Impedance 1k $\Omega$ or less. 0 - 3.000V per 0-30000(3000) digit. Conversion PWM style. Output Accuracy: Measuring resistance accuracy +0.2% F.S.
Insulation resistance	:	Whole terminals – Enclosure 500VDC 100M $\Omega$ or more
Withstanding voltage	:	Whole terminals – Enclosure 1000V AC for 1 minute Measuring terminals – Output terminals 500V AC for 1 minute
Parameter storage	:	Parameters set by Key operation are stored in EEPROM even after power-off.
Power supply voltage	:	LR6 (AA) Alkaline batteries 6 pc. Or Special AC adapter.
Battery life	:	Approx. 5 hours (continuous, w/o temperature input)
Operating ambient temperature	:	0 to 50 $^{\circ}$ C
Storage temperature	:	-20 to 70 $^{\circ}$ C
Weight	:	Approx. 1kg.
Accessories	:	Kelvin clip (5811-21B) ..... 1pc. Instruction manual ..... 1pc. Special AC adapter ..... 1pc. LR6(AA) alkaline batteries ... 6pc.

## 8.4●Table of initial set values (at delivery from factory)

Resistance measuring range	3Ω
Voltage measuring range	15V
Sampling rate	SLOW
Voltage limit	ON
Key-lock	OFF
Zero adjust	OFF
Temperature sensor	K
Temperature sensor scanner	T1
RS-232C	9600bps, N, 8, 1

## 8.5●External dimensions



## 8.6●Option

Lead wire for resistance calibration: 5811-51

### Contact Information

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 Address : 1-3-23 Minami-Sumiyoshi, Sumiyoshi-ku, Osaka-shi  
 558-0041 Japan